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**OPERATIONAL SUSTAINMENT:
THE IMPACT OF CRITICAL DECISIONS UPON
OPERATIONAL DESIGN**

**A Monograph
by
Major Stephen P. Peterson
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**School of Advanced Military Studies
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Finally, two broad doctrinal implications derive from these conclusions. The selection of an initial sustainment base should be included as one of the critical decisions in FM 100-5. FM 100-5, FM 100-10, FM 100-16, and FM 63-5 should be consistent in describing these decisions and should address ways to minimize the impact of these decisions. Most importantly, responsive methods, techniques, and procedure for conducting operational supportability analyses must be developed for effective contingency planning in order to better integrate planning.

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Decisions Upon Operational Design

by

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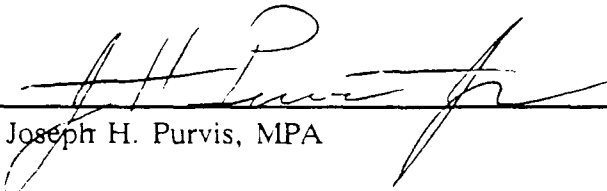
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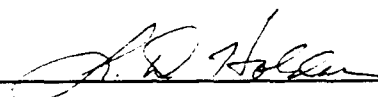
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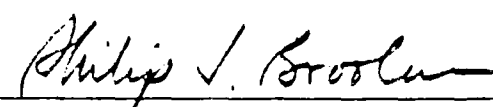
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ABSTRACT

OPERATIONAL SUSTAINMENT: THE IMPACT OF CRITICAL DECISIONS
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This monograph examines the dynamic tension between operational sustainment planning and operational design. Operational planners must fully consider both the limitations and possibilities of operational sustainment and its inherent risks when designing campaigns and major operations. Consequently they must thoroughly understand this tension and how to minimize its detrimental impacts upon planning. Of particular importance are the critical sustainment decisions which concern the interface of sustainment and combat activities.

The paper's purpose is to answer the question: Does doctrine adequately describe the impact of these critical sustainment decisions on operational design? The examination focuses upon both the description of the impacts and methods for minimizing those impacts. Then three case studies of campaigns wherein an initial sustainment base was lacking are analyzed in terms of the decisions concerning lines of support, staging, altering lines of communication, sustainment priorities, and force expansion.

The analysis leads to four broad conclusions. First, that the doctrinal description of the impact of these decisions contained in FM 100-5 is adequate. Second, that the selection and organization of an initial sustainment base is a critical decision interfacing combat and sustainment activities not specifically identified as such in FM 100-5. Third, from an operational sustainment perspective, that a campaign plan is inadequate if only a general concept of operations without specific planning details exists for the second and subsequent phases of the campaign. Fourth, that doctrine does not adequately address the issue of minimizing the impact of these critical sustainment decisions upon operational design.

Finally, two broad doctrinal implications derive from these conclusions. The selection of an initial sustainment base should be included as one of the critical decisions in FM 100-5. FM 100-5, FM 100-10, FM 100-16, and FM 63-5 should be consistent in describing these decisions and should address ways to minimize the impact of the decisions. Most importantly, responsive methods, techniques, and procedures for conducting operational supportability analyses must be developed for effective contingency planning in order to better integrate planning.

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I. INTRODUCTION

The more I see of war, the more I realize how it all depends on administration and transportation ... It takes little skill or imagination to see where you would like your army to be and when; it takes much knowledge and hard work to know where you can place your forces and whether you can maintain them there. A real knowledge of supply and movement factors must be the basis of every leader's plan; only then can he know how and when to take risks with those factors, and battles are won only by taking risks.¹

Sir A.C.P. Wavell

Historically, logistics has been an important component of the operational level of war. Increasing mechanization and technological sophistication of modern armed forces have led to a very complex system of continuous supply from a strategic base. As a result, theater logistics has become a *more integral factor* for success in war, yet very complex and far reaching in its impacts upon operational capabilities.

The most essential challenge an operational commander faces is establishing a proper balance among ends, ways, means, and risk during both planning and execution.² Sustainability analysis is one of the keys to achieving this balance. Campaigns or major operations may be limited in their design and execution by the structure and resources of the theater of war or theater of operations.³ These sustainment constraints should be minimized so as to provide the operational commander the maximum freedom of action and flexibility.

The constraints imposed by the operational sustainment system can have many effects upon campaign design and execution. Limitations upon operational maneuver or upon the ability to exploit tactical success may have considerable impact upon a commander's decision concerning when and where to fight or whether to accept or decline battle. These constraints must be properly considered and risks balanced during both planning and execution.

This consideration of sustainment constraints and balancing of risks therein lead to a dynamic tension between sustainment and operational design. Both the possibilities and limitations of sustainment must be continually examined and the concepts of operations and sustainment adjusted appropriately in order to achieve the maximum combat results.

Considering that in future conflicts the U.S. will most likely conduct war from a limited sustainment base with a fragile political and civil will, operational planners can expect to be faced by new and unique challenges imposed by sustainment constraints. Many scenarios may require forces to deploy to an area with very austere or no U.S. sustaining base capability. In order to face these challenges, operational planners must thoroughly understand this tension between sustainment and operational design and how to minimize its detrimental

impacts upon planning. They must not allow this tension to constrain their imagination and determination.

This paper investigates the critical operational sustainment decisions which concern the interface of combat and sustainment activities. It will answer the question: Does doctrine adequately describe the impact of these critical sustainment decisions on operational design? The examination's focus is upon both the description of the impacts and methods for minimizing those impacts.

The analysis begins with an examination of how theory and doctrine describe the tension between sustainment planning and operational design. This is followed by an examination of the doctrinal prescriptions for minimizing the effects of this tension for more effective integration of planning.

Then three case studies are analyzed in terms of the critical sustainment decisions identified in FM 100-5 Operations -- lines of support, staging, altering lines of communication, sustainment priorities, and force expansion. Since all three cases are examples where conditions precluded the initial establishment of a sustaining base within the theater of operations, an additional decision, selection and organization of an initial sustainment base, is also examined.

The first two cases are historical analyses of the Allied Normandy Campaign of 1944 and the British Falklands

Campaign of 1982. The third case study is an analysis of a hypothetical U.S. scenario in Southwest Asia to demonstrate the contemporary impact of these operational sustainment planning decisions.

II. OPERATIONAL SUSTAINMENT

Logistics comprises the means and arrangements which work out the plans of strategy and tactics. Strategy decides where to act; logistics brings the troops to this point.⁴

Baron de Jomini

Before examining the interaction between operational sustainment and operational design, one must first understand exactly what operational sustainment is. Operational sustainment "comprises those logistical and support activities required to sustain campaigns and major operations within a theater of operations. Operational sustainment extends from the theater sustaining base or bases which link strategic to theater support functions, to the forward CSS units and facilities organic to major tactical formations."⁵

The definition used above is the context for operational sustainment used throughout the rest of this paper. However, one must remember that operational sustainment is a relatively new term. Classical theorists use the term logistics in the context of strategy to describe operational sustainment.

Given this context, how does operational sustainment interact or create tension with operational design? Both

theory and current doctrine reveal much about this interaction.

Theory

What I want to avoid is that my supplies should command me.⁶

Comte de Guibert

There are several different theoretical perspectives on logistics or operational sustainment and its impact upon operations. However, most theorists agree on the general concept of logistics and how it interacts with planning and executing operations.

Baron de Jomini viewed logistics as one of the six integral and distinct parts of the art of war.⁷ To him logistics was inseparable from strategy (contemporary operational art) and continuously interacted with it.

At the operational level of war, he saw logistics as a system of continuous supply from a base of operation along lines of communication (LOC) through accidental intermediate bases of operations between the objective point and the primary base.⁸ Naturally he saw great interaction and tension between logistics and strategy -- each was dependent upon and linked to the other.

First, he stated that the general configuration of bases of operation influenced the direction to be given the line of operations of the armies, especially in that the two should be oriented so that the lines of operation protected the base of operations.⁹ He felt that the lines of operation were in fact dependent upon the location and

configuration of the base(s) of operation.

A second interaction in his mind was that as the army progressed in whatever direction that there would need to be a succession of bases established to continue support.¹⁰ This is the modern concept of staging. Furthermore, that as the front of the army or its direction changed so must the direction of the LOC and potentially the configuration and location of bases. He saw such an altering of LOC and/or base of operations as a very important action which could lead to great success or equally to great disasters.¹¹

He best summed the interaction between bases, LOC, and lines of operation as

the great art of properly directing lines of operation, is so to establish them in reference to the bases and to the marches of the army as to seize the communications of the enemy without imperiling one's own, and is the most important and most difficult problem in strategy."¹²

Although Clausewitz did not include logistics within his narrower definition of the art of war, he did see that there was a constant interaction between it and the utilization of forces.¹³ In terms of the general impact of logistics upon war or operations he felt that at first the supply system would govern as much as other governing factors would permit, but where resistance grew stronger, the conduct of war would react on the supply system and so dominate it.¹⁴

His position was that a base of operations could not be shifted quickly and that its location would restrict

the direction of operations to some extent, but the extent and weight of the influence would depend on how the war was to be conducted.¹³

Doctrine

... there must be a clear-cut, long-term relationship established between operational intentions and administrative resources. Successful administrative planning is dependent on anticipation of requirements.¹⁴

Field Marshal Montgomery

In terms of the importance of operational sustainment and its tension with operational planning, AirLand Battle Doctrine is very similar to the theory previously discussed. This is not very surprising since doctrine should be fundamentally based upon the history and theory of warfare.

AirLand Battle Doctrine describes a vital role for sustainment:

Sustainment is a central, potentially decisive aspect of operations, not an adjunct to them. It is as important to success as any other part of the commander's operational plan. To meet the sustainment challenge, commanders must grasp both the operational and logistical possibilities and limitations of their situation. The most successful commanders have been those who pressed their operations to the very limit of their sustaining power -- but not one step further.¹⁷

This statement reveals much about the character of the tension between sustainment and operational design. Operational planners should seek the most efficient use of their sustainment resources to achieve the operational objectives through all means available.¹⁸ During execution a commander and his staff must balance current

consumption with the need to conserve and build-up support for subsequent operations.¹⁹ Sustainment capabilities must be balanced against requirements and the resultant risk analyzed for its impact upon operations.

As can be readily seen, operational sustainment is an integral part of operational design and must be carefully considered during all phases of planning and execution. The result is a dynamic tension between sustainability and the other elements of operational design. However, it should be possible to identify some critical sustainment planning decisions which interface with combat activities upon which planners can focus their integrative energies.

FM 100-5 Operations identifies five such decisions: (1) lines of support, (2) staging, (3) altering lines of communication, (4) sustainment priorities, and (5) force expansion²⁰; whereas, FM 100-10 Combat Service Support identifies only four of these same decisions. It omits force expansion. Surprisingly, FM 100-16 Support Operations: Echelons Above Corps and FM 63-5 Combat Service Support Operations - Theater Army fail to address any of them. As the "how to support" manuals for operational sustainment, one would expect them to describe these decisions.

A short discussion of each decision identified in FM 100-5 and its inherent risks follows.

Lines of Support

The lines of communication linking the theater sustainment base(s) to the tactical forces should be established to provide continuous support. Their selection is influenced by several factors: geography, the availability of transportation networks (air, water, road, and pipeline) and operating assets, the ability of the enemy to interdict them, and their relation to the intended lines of operation.²¹ Planners must consider the risk of LOC being interdicted or severed by the enemy and consider the use of combat forces to protect them or secure new ones.²²

Staging

During the course of operations, LOC may become overextended and require the staging of sustaining bases either forward as a force advances or rearward as a force withdraws. Staging may require improvement or construction of facilities, additional movement control, and potentially alterations to existing LOC.²³

Most importantly for operational design, a commander and his staff must understand the relationship among time, LOC extension, and forward combat power. Longer LOC consume additional resources which could have been available for combat units. Staging must be timed and balanced against the risks of reaching culmination due to overextension or disrupting the tempo of operations.²⁴

Staging should be weighed against current consumption and preparations for future operations.

Altering Lines of Communication

Several operational needs may necessitate altering the LOC: unexpected threats or opportunities, a need to reorient the main effort, or damage or interdiction of the LOC. Ideally, the LOC are located so as to accommodate shifts in operational direction without major readjustment of the sustainment system.²⁵ Alterations must be carefully planned and executed to minimize the risk of a major disruption of the sustainment structure or tempo of operations.

Sustainment Priorities

Since a commander will seldom have unlimited sustainment resources, he must always conserve his resources and thus establish priorities for support. As operations progress priorities may need to be shifted to exploit an operational situation, conduct reconstitution, prepare for future operations, or shift the main effort.²⁶ Any shift in priorities will require a review of support relationships, sustainment organization, and may require alteration of LOC or staging.²⁷ Priorities are a way to ensure support to the most vital aspects of operations.

Force Expansion

Whenever the force in a theater is either expanded or reduced, the commander must make sure that the resultant force contains a proper balance of combat, combat support,

and combat service support forces at every stage of the expansion or reduction.²⁸ The commander must balance his ability to support the force with his operational needs, otherwise he risks disruption of sustainment. Force expansion decisions impact upon the other four sustainment decisions discussed previously and thus incur secondary risks inherent to them.

Minimizing the tension

How does doctrine address the issue of minimizing the impacts of these critical sustainment decisions?

Knowledge alone of the impact of these decisions is not sufficient for effective integration of planning.

Planners must have methods to ensure such integration.

FM 100-5 provides a good conceptual foundation for integrating sustainment and operational planning. Specifically, it recommends a continuous exchange of operational and sustainment information within the planning staff, periodic evaluations of requirements and capabilities, ensuring changes are in consonance with the plan, and most importantly good contingency planning.²⁹

These are basic tasks for integrative planning and allow the staff, especially the sustainment planners, to anticipate requirements and add flexibility to the design of a campaign.

Standard operating procedures are effective for ensuring the exchange of information and timing of planning tasks. However, sustainment planners must be

able to responsively conduct sustainability analyses in support of planning branches and sequels. This demands methods and procedures to accomplish these "quick" analyses.

The army's "how to" doctrinal manuals should prescribe these methods. However, the "how to" manuals oriented at the operational level war leave much to be desired.

FM 100-6 Large Unit Operations (Coordinating Draft) basically repeats the conceptual ideas from FM 100-5. Its only unique suggestion is that the control, positioning, and priority of sustainment will be a major consideration in the development of campaign or major operations plans.³⁰

The operational level sustainment manuals are not much better. FM 100-10 Combat Service Support and FM 100-16 Support Operations: Echelons Above Corps do not specifically address branches and sequels much less prescribe methods to conduct sustainability analyses for them. This situation leaves sustainment planners at the mercy of "rummaging" through a plethora of functional "how to" manuals for detailed analysis methods which are primarily focused upon execution of support at the tactical level rather than planning for operational sustainment.

III. OPERATIONAL SUSTAINMENT CASE STUDIES

The three case studies presented here are examples of campaigns in which a force must be projected into an area lacking an initial sustainment base. Consequently, initial operations are supported either from a base external to the theater of operations or from offshore.

The Allied Normandy Campaign of 1944 is an example of a campaign which was preceded by an extensive logistical build-up and very detailed planning. Development of a sustainment base would be eased by the well developed infrastructure on the Continent, albeit much repair would be needed for expected war damage.

In contrast, the British Falklands Campaign of 1982 is an example of a hurriedly planned campaign. In this case the commander possessed very few logistical resources and was seizing a lodgment in an area with almost no infrastructure.

The final study is a hypothetical U.S. scenario in Southwest Asia. The character of its operational sustainment should lie somewhere between the extremes of Normandy and the Falklands.

The purpose of these studies is to examine the differing impacts which sustainment constraints had upon operational design and gain insight into their contemporary impact.

The examinations are limited to the five sustainment decisions from FM 100-5 and a sixth, the selection and

organization of an initial sustainment base. Choice of the initial base of operations must consider all the other five sustainment decisions, but its location is the foundation upon which the other five are analyzed. Additionally, the first two studies examine the integration of sustainment and operational planning.

Normandy

The invasion of Normandy in June 1944 was one of the largest amphibious operations conducted in modern military history. This invasion was the supreme effort of the Western Allies to defeat Germany.³¹ The strategic concept was to secure a lodgment from which to build up forces and then conduct a major land campaign resulting in the invasion and defeat of Germany.³²

The design of this campaign required considerable logistics planning which was a major factor in determining the design of operations. Specifically, logistics was a constant and overriding factor in the conception, planning, and execution of the campaign; logistics dominated the setting of objectives, the speed of attaining them, the choice of landing sites, the scale of the assault, and plans for build-up and initial operations inland.³³

An examination of the development of the plan for the invasion reveals many of the impacts logistics had upon the planning and design of the campaign.

Planning for the Normandy began in 1942 and progressed through a series of contingency plans under various planning staffs and culminated in the OVERLORD and NEPTUNE plans. The great challenge to the planners was to achieve conditions where the Allies could flow troops over the beachhead faster than the Germans could reinforce.³⁴

The planners were given a limited mission of conducting an operation to seize a lodgment on the continent of Europe from which further offensive operations could be developed. The lodgment had to have sufficient port and beach facilities to maintain 26-30 divisions and allow reinforcements at a rate of 3-5 divisions a month.³⁵

Two of their primary tasks were to determine where and with how many forces to conduct the invasion. This analysis inevitably turned to port and beach capacities. Thus, port and beach capacities along with air cover distance from Britain, road nets to allow rapid egress from beachheads, weak enemy defenses, and airfields available for capture or land on which to build them became the primary criteria for selection of the assault site.³⁶

The planners expected that it would take 30 days to put captured ports into operation due to enemy damage. This meant that initially the operations would need to be supported over the beaches from 30 to 90 days. However, the beaches alone could not serve as "ports" due to the

increasing build-up rate and the fact that Liberty ships would be the primary mode of transporting troops and stores and required port facilities for efficient offload.³⁷

In order to meet the discharge requirements, five groups of ports and associated beaches were considered (See Appendix A). Analysis showed that two adjacent groups of ports would be needed after the first three months in the lodgment.³⁸ Therefore, one of the first operations after securing a beachhead would be to secure a second group of ports.

The Normandy/Cherbourg group was the final choice.³⁹ However, the Normandy beachhead area had no major port. The first part of the solution was to build and install two artificial ports, MULBERRIES, off the beaches. The second part was to add another beach on the Cotentin Peninsula and to enlarge the assault force in order to capture the port of Cherbourg earlier.⁴⁰

After selecting the place and size of the assault, plans were finalized. All subsequent operations after seizure of the beachhead was based upon supportability, expected rates of advance, and the rate of force expansion. The sequence of operations was envisioned as:⁴¹

- (1). Seizure of the beachhead.
- (2). Expansion south to secure depth for a turning movement up the Cotentin Peninsula.
- (3). An attack to seize Cherbourg.
- (4). Expand further south and southwest for base development.

- (5). At this stage the commander could decide whether to conduct operations to secure either the Brittany or Seine ports. However, the Americans preferred the Brittany ports.
- (6). A long period of reorganization and consolidation.
- (7). Operations to break enemy defenses of the Seine River and capture Paris.
- (8). A pause of up to three months to prepare for further offensives.

The final plan, OVERLORD, was not a complete operational plan. The only phase with many details was that of securing the lodgment, especially the assault portion (See Appendix B for a map showing the timeline development of the lodgment). The later phases were just schemes of maneuver and timetables as frames of reference for future planning and preparation. The logistics plan focused upon capture of the lodgment, rapid organization of the beaches and subsequent bases and port, development of LOC, and the rapid build-up of forces and stores.⁴² The lack of details and branches for the later phases of the campaign led to logistics planners focusing solely upon their single concept of support which became very inflexible.

The base development plans were very detailed. The beaches were to be the initial bases followed by establishment of bases in the Cherbourg and St. Lo areas. Cherbourg was to be the focal point for the development of all the initial American LOC. It was to be the origin of all railroad, pipeline, and road construction (See Appendix C). After operations changed direction (turn either to Brittany or the Seine), the next base area would

be developed in the Rennes-Laval-Chateaubriant area. This base along with the Brittany port area would then become the primary bases for subsequent operations.⁴³

This extensive base development generated a continuous debate over the appropriate ratio of combat, air force, and service troops. The emphasis on build-up and needs for construction required a larger number of service troops than normal. The ratio was balanced as best as possible given expected availability of forces.⁴⁴

Logistics priorities also, reflected the build-up emphasis. Priorities were for the build-up of the lodgment and all operations supporting that goal. Construction and accumulation of stocks were high on the list.⁴⁵

The result of all the planning was a very comprehensive and detailed logistics plan with very tight timetables and rigid priorities. It had been fairly well coordinated among the many agencies involved, but there was very little flexibility left for the unexpected.

In actuality, operations were far different from what was anticipated. Initial progress was retarded and fell behind the timelines, only to be followed by a very rapid breakout and pursuit beyond the Seine River. This left the logisticians woefully unprepared to support the pursuit.

The basic problem was an inability to rapidly extend the LOC and provide both current consumption needs and

stage operational reserves forward. The efforts taken to support the pursuit were done at the expense of continued expansion of the sustainment base which ultimately led to a culmination of support.⁴⁶

In the final analysis, the five critical sustainment decisions -- lines of support, staging, altering LOC, force expansion, and priorities -- plus the selection of the initial bases of support had great impact upon the operational design of OVERLORD. In many cases, operations were changed or planned primarily to support sustainment needs. Once the campaign was underway, several operations were conceived, considered, and rejected because they were unsupportable.⁴⁷

Ultimately the logistical difficulties were the result of faulty planning. The logistical plans were too rigid, based on optimistic estimates of advance and repair, gave inadequate credit to improvisation and determination, and most of all virtually ignored the friction and chance of war. This was partially due to the lack of operational details for the later phases of the plan after securing the lodgment. To compensate, logistical plans were based upon hypothetical operational options and assumed progress and conditions of the areas captured.⁴⁸ The result was an operational plan which placed ports and the lodgment as its primary objectives rather than the Germany forces in Army Group B.

Falklands

The British Falklands Campaign is an example of a campaign which was very quickly conceived, planned, and executed. The British deployed Task Force 317 composed of a Carrier Battle Group, Amphibious Task Group, and Landing Force Task Group within days of the Argentine invasion.²⁹ Speed was of the essence as winter would come to the South Atlantic in June and would severely hamper air operations and sustained land and sea operations.

They were also concerned about the fragility of their LOC and their ability to support such a force over the distance involved. The following statement captures the military concerns at the time:

Britain was going to war at the end of a 7 1/2 thousand mile long logistic pipeline, outside the NATO area, with virtually none of the shore-based air we normally count on, against an enemy of which we knew little, in a part of the world for which we had no specific plan or concept of operations.³⁰

The initial operational concept envisioned five phases:³¹

1. Approach and work-up during April.
2. Blockade of a Total Exclusion Zone (TEZ), demonstration of force, reconnaissance of the Falklands, and amphibious approach.
3. Landing, establishment of beachhead.
4. Development of land operations and main battle for Port Stanley.
5. Post surrender operations.

The initial Task Force was deployed throughout April. The Carrier Battle Group sailed immediately to establish sea and air superiority within the TEZ around the Falklands while the Amphibious and Landing Groups staged

at Ascension Island to restow equipment and stores and conduct limited landing rehearsals.³²

Reinforcements of navy combatants, logistics ships, an infantry brigade with support troops, and aircraft, especially helicopters were added due to losses by the Carrier Battle Group, a reappraisal of the threat, and a failure to achieve air and sea superiority as a precondition for forced entry.³³ Consequently, the mission for the landing force was changed from seizing a landing and repossessing the Falklands to a more limited objective of landing to secure a beachhead, build-up and reinforce, then conduct land operations to repossess the Falklands.³⁴ The plan was then modified accordingly.

Two basic planning issues for the landing were greatly affected by logistics -- when and where. The rate of logistics build-up prohibited landing any earlier than 14 or 15 May despite desires to move more quickly.³⁵ Choosing the landing site led to some tension between the land and the naval amphibious planners. The land planners wanted a site with a short approach and LOC to Port Stanley where the decisive battle would be and the naval planners wanted anchorages secure from bad weather, Exocet and submarine attack, mines, and suitable for air defense with the assets on hand.³⁶

Five sets of sites were considered: Cow Bay/Volunteer Bay, Port Salvador area, San Carlos area, various bays in Lafonia, and various bays on West Falkland

(See Appendix D). The naval viewpoint won out and the San Carlos area was selected.⁹⁷ San Carlos's advantages met the navy's requirements, however a major sustainment disadvantage was the requirement for a LOC of 50 miles to Port Stanley to be supported with a small number of helicopters.

So how was this Task Force to be supported? The operational sustainment concept was based upon two theater support bases -- Ascension Island and the sustainment vessels afloat with the Task Force.⁹⁸

Ascension Island was the rear support base and the link to the strategic LOC from Britain. It was operated by a navy unit, British Forces Support Unit Ascension Island (BFSUAI), and was the source of the supply distribution network via both a SLOC and ALOC the Task Force (See Appendix E).⁹⁹ Although operated efficiently, initially priorities for resupply were automatically given to the fleet over the land force until a land force element was added to the BFSUAI.¹⁰⁰

The forward support base consisted of the supply ships in the Task Force. They would be kept offshore and supplies unloaded on call.¹⁰¹ Medical evacuation was to be from ashore to a troopship offshore and from there to a hospital ship off Pebble Island. Then three small ships were to shuttle casualties to Montevideo, Uruguay, for air evacuation to Ascension Island and later back to Britain.¹⁰²

Planning for sustainment of the landing and subsequent land operations was conducted enroute to Ascension by the Amphibious and Landing Force Task Group staffs. However, coordination and integration was hampered because the logistics planners were on a different ship from the operational planners and radio listening silence had been imposed.**

The sustainment plan for the landing was to provide two Landing Ship Logistics (LSL) floating reserve. Each one could support a separate landing site or if there was only one site, the second would be a general reserve. These ships were to shuttle between the forward support base and the landing site(s).** Yet, the plan was overly dependent upon helicopters for supply movements. Planners had limited the number of vehicles in the landing force due to the lack of roads and rough, boggy terrain in the Falklands. **

Once the landing force was ashore, the sustainment plan was for Ajax Bay to serve as the primary base with forward bases to be established later at Teal Inlet and Fitzroy (See Appendix F).**

Once the operation was underway, enemy air attacks sank and damaged several ships causing a major change to the support plan. First the forward support base of ships was moved and consolidated in a Tug Repair and Logistics Area (TRALA) on the northeast edge of the TEZ (See Appendix G). Secondly, the stores from the LSLs were

dumped onto the beach in an area which was totally unsuitable for such large storage. Thereafter, ships were only allowed in San Carlos Bay at night.

Support was hampered by a severe shortage of helicopters -- reinforcements had been lost with the sinking of the Atlantic Conveyor. For the first few days almost no resupply occurred due to short hours for ship unloading at night and the use of helicopters to unload tactical equipment. For the rest of the operation balancing helicopter usage between sustainment and tactical movements remained a constant tension.⁶⁷

The result of this movement problem was a very slow build-up at San Carlos and a change in the employment of the reinforcing infantry brigade.⁶⁸

As can be seen, all five critical sustainment decisions had key impacts on the operational design of the campaign. The ability of staging support forward delayed initiation of the landing to 14/15 May at the earliest. The selection of the initial sustainment base and landing sites were influenced by competing needs for short LOC and protection of the forward floating base of support. The focus upon securing a lodgment for a sustainment base led to later sustainment and operational problems. The build-up at San Carlos was severely delayed by the daily altering of the LOC between the TRALA and the beachhead and inadequate resupply helicopters.

In conclusion, the support provided to the Falklands Task Force was a remarkable feat considering the hurried manner in which it was planned and executed. The support force overcame deficiencies and friction by sheer determination and improvisation. However, had chance been less kind or enemy resistance stronger, it is questionable whether a much longer campaign could have been sustained adequately.

Southwest Asia

Any contemporary campaign by U.S. Central Command (USCENTCOM) in Southwest Asia would lack an initial sustaining base within the theater of operations or area of operations. The hypothetical scenario used by the School of Advanced Military Studies (SAMS), U.S. Army Command and General Staff College during academic year 1988/1989 is a good example for analysis of operational sustainment constraints and impacts.* The scenario is as follows.

Tensions between the People's Democratic Republic of Yemen (PDRY) and Oman lead to a state of undeclared war between them. PDRY with Cuban and Soviet assistance is supporting insurgent forces within the Dhofar region of Oman and attacking Omani shipping and oil facilities. The volatile situation and the threat to shipping in the area prompts the nations in the Persian Gulf region to request United States commitment to security of the region.

The concept plan (CONPLAN) is to form a Joint Task Force, JTF ALTO in the '89 exercise, and to deploy it to the region if necessary. Its basic composition is one Navy Task Force, one Tactical Air Force, one Army Corps, one Army Support Element, and one Marine Expeditionary Force (See Appendix H for detailed composition). Its mission when directed is to:

prevent the closure of the Bab el Mandeb Straits and protect U.S., Allied, and neutral shipping in the Gulf of Aden, the Gulf of Oman, and the Arabian Sea; prevent seizure of the Omani littoral bordering the Arabian Sea; protect Omani oil fields; defeat an invasion force in Oman and restore Omani borders; and provide logistical support to the Omani military forces, if required, to the extent possible without jeopardizing USCENTCOM forces.

The campaign for JTF ALTO is to be in four phases:

- (1). Deployment. Naval fleet deploys to JTF area of operations (AO, Appendix I). Marine forces prepare for amphibious operation in Salalah area. Army and Air forces deploy to forward staging areas.
- (2). Employment. Port of Salalah and Thamarit Airfield are secured. Air forces achieve air superiority.
- (3). Relief and Ground Combat. Army forces relieve the Marine forces and complete deployment. Marine forces reembark. Army forces prepare and conduct combat operations if PDRY invades Oman.
- (4). Redeployment. After successful combat operations, redeploy U.S. forces consistent with leaving Omani forces in condition to defend against further PDRY aggression.

The nature of this AO would have severe impacts upon operations, especially logistics. The terrain is rugged and barren. Water is a scarce commodity. Wear and tear on equipment is extreme. The monsoon season severely disrupts operations on the coastlines. Finally, almost no

roads or host nation support capability exists. Logistics is further constrained by the prohibition of construction of permanent facilities.

An initial planning problem is selection of a sustaining base(s). Seven potential bases are available for use (See Appendix J). All have a port facility and airfield(s) with varying capabilities. However, none is large enough to be the sole sustaining base for the entire JTF without major construction. Furthermore, they are all geographically distant from each other which will require a significant intra-theater lift (air and sea) capability to maintain a continuous sustainment flow.

Protection of these dispersed support bases and the LOC, both strategic and intra-theater, is an important concern. The threat to the LOC and proximity of some of these bases to PDRY (See Appendices J and K) may require the dispersion of austere air defense assets and the commitment of naval and air forces for their protection.

Despite all these handicaps, all seven of these bases probably will be needed in some capacity for support of JTF ALTO due its final deployed size and the dispersed nature of its operations.

An examination of the five critical sustainment decisions for each of the first three phases, to include several branches, should reveal some of the impacts on the initial conceptual operational design.

Phase I

The logical priority of sustainment in this phase should be to support of fleet operations and amphibious preparations, establishment of LOC (air and sea), initial operational capability of ports and airfields outside Oman, and support to the staging of land and air forces. This will require early deployment of support units for these missions which could delay the initiation of Phase II.

Ras Banas could serve as the primary support base for the staging of land forces in Egypt if politically approved by Egypt. However, this staging of forces may later require augmentation with intra-theater airlift for deployment to Oman and thereby degrade support of other critical operations.

Phase II

Priority of sustainment during this phase should be support of operations to secure the Salalah area, air force air superiority operations, and the establishment of a forward support base in the Salalah area.

Support of the amphibious operations should be relatively smooth as both the Navy and Marine forces are basically self-sufficient. However, support of the air forces is complicated due to the location of their operating airfields. The vast majority are in Saudi Arabia and the United Arab Emirates. The best suited support base is Ras Tanuras. Yet, it has limited dry

cargo storage facilities. The result is that the air forces would be almost solely dependent upon airlift for dry cargo resupply.

To accomplish their air superiority mission the air forces may require a surge from intra-theater airlift in order to stage assets forward closer to PDRY to generate adequate sortie rates for its air superiority mission. This could leave inadequate airlift to shift stores from outside Oman to Salalah or require use of sealift and thereby create congestion in that port in competing with follow-on Marine forces for the limited berths.

One branch to this phase could be that the Salalah area is occupied by a larger enemy force than expected requiring the commitment of USCENTCOM's reserve airborne division in support of the amphibious landing. This would require considerable shifting of stores and support units within the AO. This would create further tensions in the priority and uses of airlift.

Another branch might be that Omani forces fail to contain the insurgency in the Dhofar region after a successful capture of Salalah and Thamarit. The resultant threat to the single ground LOC from Salalah to Thamarit and the airfield at Thamarit could require commitment of unanticipated forces to protection missions and prevent the deployment of Air forces to Thamarit.

Phase III

The priority of sustainment in this phase should be support of air and ground operations and continued development of the sustainment bases in the area of operations.

As Marine and naval air assets are withdrawn the need for forward staging of Air Force assets will increase. Again this may overburden airlift requirements. The scale of ground operations may have to be reduced if the remaining available airlift is inadequate to support the continued staging of supplies forward.

The potential congestion at both the airfields and port in the Salalah area during redeployment of the Marine forces while simultaneous deployment of army units is ongoing will most likely delay sustainment build-up. As the storage capacity in this area is limited, the most likely result would be further limitations on ground operations. The overall result could be a considerable delay in initiating an offensive to eject the PDRY forces from Oman.

This possibility is further exacerbated by the single ground LOC and terrain between Salalah and Thamarit. The ability to stage adequate sustainment assets forward to Thamarit once the offensive began could also be delayed.

A potential branch in this phase is that the SLOC through the Red Sea and Bab el Mandeb is interdicted causing the rerouting of CONUS shipping around the Cape of

Good Hope. The resultant delay in the sustainment flow, especially fuel, probably would put a brake on ground offensive operations.

The worst possible branch would be a failure to capture the Salalah area. An attempt to deploy forces into the Muscat area for subsequent advance along the Muscat to Thamarit road is probably unsupportable. This two lane asphalt road is approximately 1000 kilometers long. An advance of that distance would require a series of several sustainment bases and consequently more truck assets and engineers to maintain the road (the limited mobilization might preclude this). If an advance was possible, it would be very slow and could result in the entrenchment of the insurgents in the Dhofar region. Finally, once the advance reached the Salalah area the LOC should be altered to Salalah-Thamarit. The simultaneous impact of altering the LOC, projected maintenance problems, and the physical condition of the soldiers would probably require an operational pause.

Summary

The basic cause of the majority of sustainment impacts upon operations is the dispersion of the theater support bases and the reliance upon intra-theater lift. The competing demands of sustainment movement and deployment of combat forces places a great stress upon a very limited number of lift assets. The possibility for problems due to friction and chance is high. However,

greatly increasing the number of lift assets might just cause undue congestion in the sustainment ports and airfields. This only shifts the problem to another portion of the sustainment system.

An operational planner must fully understand the impact of the austerity and dispersion of his sustainment base. Operations must be carefully timed and sequenced to coincide with expected support capabilities.

IV. CONCLUSIONS

The two historical case studies tend to support Martin Van Creveld's assertion that

most armies seem to have prepared their campaigns as best they could on an ad hoc basis, making great, if uncoordinated, efforts to gather together the largest possible number of tactical vehicles, trucks of all descriptions, railway troops, et cetera, while giving little, if any, thought to the "ideal" combination which in theory, would have carried them the furthest.⁷⁰

The failure to appreciate the full impact of their sustainment decisions and carefully integrate and minimize their inherent risks into the operational designs limited the ability of the commanders in both the Normandy and Falklands campaigns to exploit unanticipated opportunities. Despite the long term success of both campaigns these missed opportunities led to prolonged campaigns.

This paper has examined the tension between sustainment and operational design focusing upon the

critical sustainment decisions which interface with combat activities. It has described the doctrine from FM 100-5, FM 100-10, and FM 100-16 concerning those sustainment decisions and ways to minimize the impact of this planning tension. That doctrine has been analyzed by comparing it to three operational sustainment case studies which examined the special case of a campaign in which the theater of operations lacked an initial sustainment base. In light of this special case the decision in selection and organization of that initial sustainment base was examined in terms of its interface with combat activities. Overall the analysis suggests four broad conclusions.

First, that the description of the five critical sustainment decisions concerning lines of support, staging, altering LOC, sustainment priorities, and force expansion contained in FM 100-5 is adequate. The range of impacts of each of the decisions described in FM 100-5 are either demonstrated by the case studies or can be logically extrapolated from them.

Second, that the selection and organization of an initial sustainment base in the special case of a theater which lacks one is a critical sustainment decision which interfaces directly with combat activities. Although this decision involves consideration of the other five, the case studies demonstrate that its impact can be much larger than the combined impact of the other five. This decision can easily dominate the operational design of a

campaign even to the extent of focusing initial objectives upon base requirements rather than upon the enemy force.

Third, that from an operational sustainment perspective, a campaign plan is inadequate if it only has a specific plan for its first phase and a general concept of operations for the later phases. The Normandy case study demonstrated this point. The length of the operational sustainment planning horizon and its inherently "slow" response to change necessitate the need for more specific planning information for later phases than just a general concept of operation. To compensate for this "slow" response, sustainment changes must not only be planned well in advance of subsequent phases but execution may have to occur during a previous phase.

Finally, that doctrine does not adequately address the issue of minimizing the impact of critical sustainment decisions upon operational design. FM 100-5 provides an adequate conceptual foundation for integrating sustainment into operational planning. It focuses on information exchange and anticipation of change through contingency planning. The historical case studies demonstrate the need for both of these actions. However, operational sustainment planners must have methods to quickly analyze the supportability of branches and sequels. An examination of the doctrinal manuals concerning operational sustainment reveals a total lack of prescription of methods and procedures for such analysis.

Several doctrinal implications arise from these conclusions.

First, although the impacts of the selection and organization of the operational sustainment base is discussed in FM 100-5, as reinforcement it should be included as one of the critical decisions interfacing with combat activities. Also, FM 100-10, FM 100-16, and FM 63-5 should be updated to include the complete list of critical sustainment decisions to be consistent with FM 100-5.

Second, all four of these manuals need to address ways to minimize the inherent risk of each of the critical sustainment decisions. As a minimum, they should cover the necessity for identification of contingencies, the long sustainment planning horizon and response time, the need for flexibility of operational sustainment in anticipation of future operations, and the establishment and enforcement of priorities.

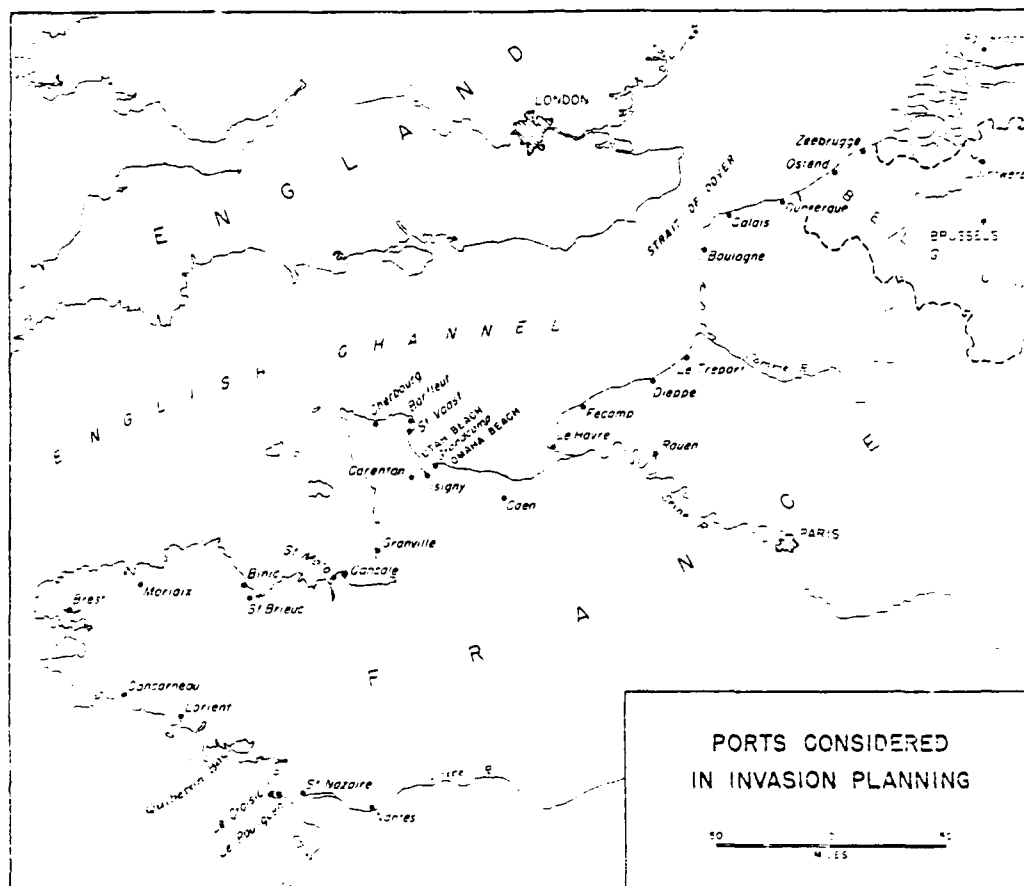
Third, logistics operators must develop responsive methods, techniques, and procedures for conducting "quick" operational supportability analyses for planners to effectively address contingencies and future plans. FM 100-16 and FM 63-5 neither contain nor refer to any. One must then turn to functional manuals for assistance. These manuals contain very detailed methods needed for execution analysis which would be, for the most part, unresponsive for a planner's needs.

A good place to start is the "Contingency Operations Logistics Checklist" contained in FM 701-58 Planning Logistics Support for Military Operations. It is a good framework for analyzing a theater's sustainment needs. Methods and procedures for conducting operational supportability analyses to answer its basic questions could be developed and published in operational sustainment "how to support" manuals.

Unless these deficiencies are corrected, operational design will continue to suffer from less than adequate integration of sustainment. Operational planners will be unable to integrate operational sustainment considerations into operational design within the required times of the planning cycle. The result may be improperly timed or sequenced operations or campaigns which cannot be effectively sustained.

The full range of sustainment limitations and possibilities must be considered and integrated into the plan particularly in terms of the impact upon the timing and sequencing of operations. Most importantly, operational sustainment means and ways must be employed effectively in time and space to provide maximum support for the achievement of operational ends.

APPENDIX A: PORT GROUPS CONSIDERED FOR OVERLORD



1. Belgian Group (Dunkerque-Antwerp)
2. Pas de Calais Group (Boulogne-Calais)
3. North Seine Group (Dieppe-Le Havre-Rouen)
4. Cherbourg or Norman Group (Caen-Granville)
5. Brittany Group (St. Malo-Nantes)

Source: Roland G. Ruppenthal, Logistical Support of the Armies, Volume I: May 1941-September 1944 (Washington, D.C.: Office of the Chief of Military History, U.S. Army, 1953), p. 180.

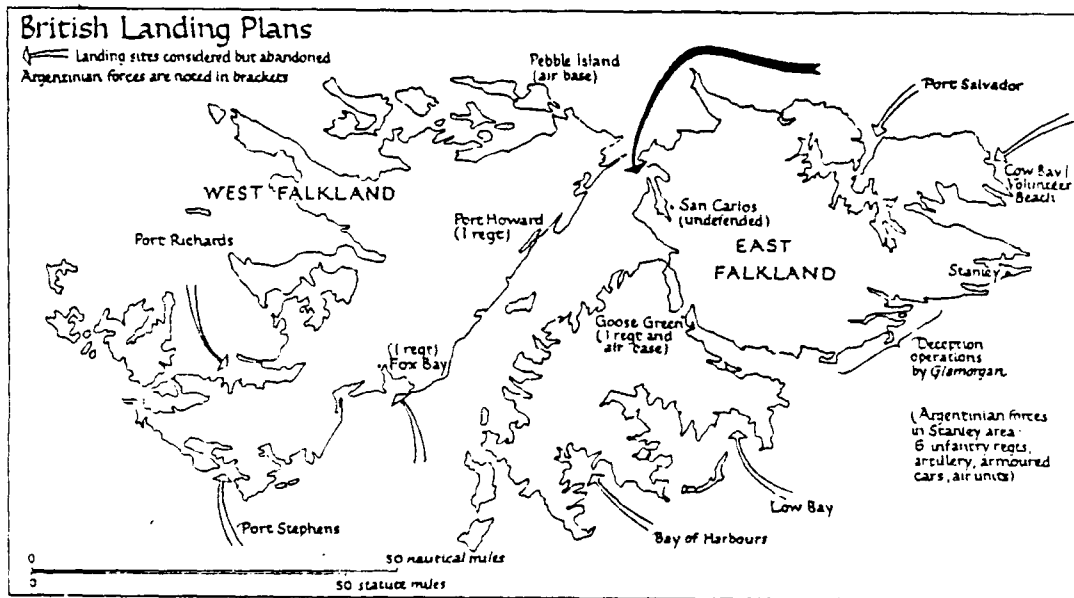
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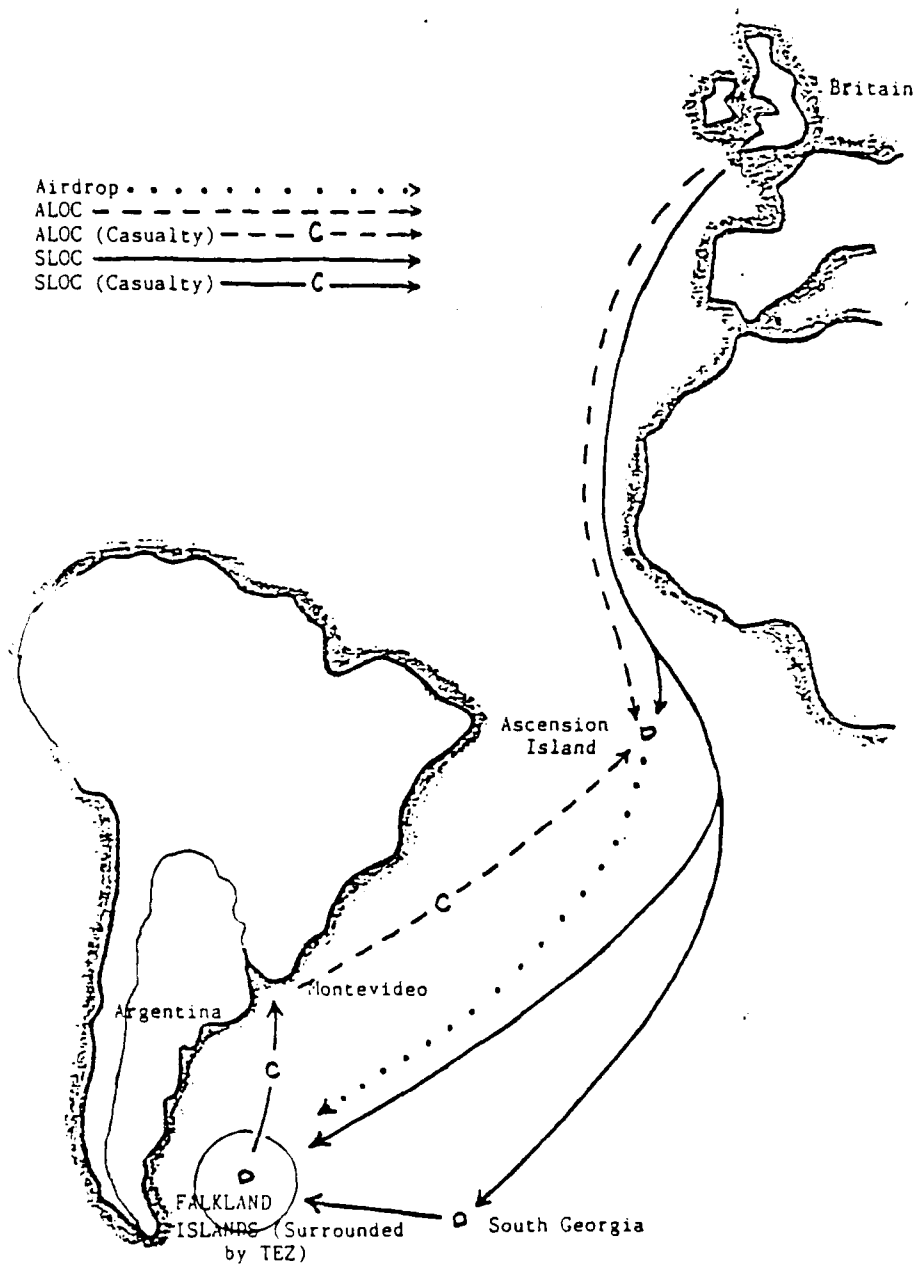
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APPENDIX D: POSSIBLE FALKLAND LANDING SITES



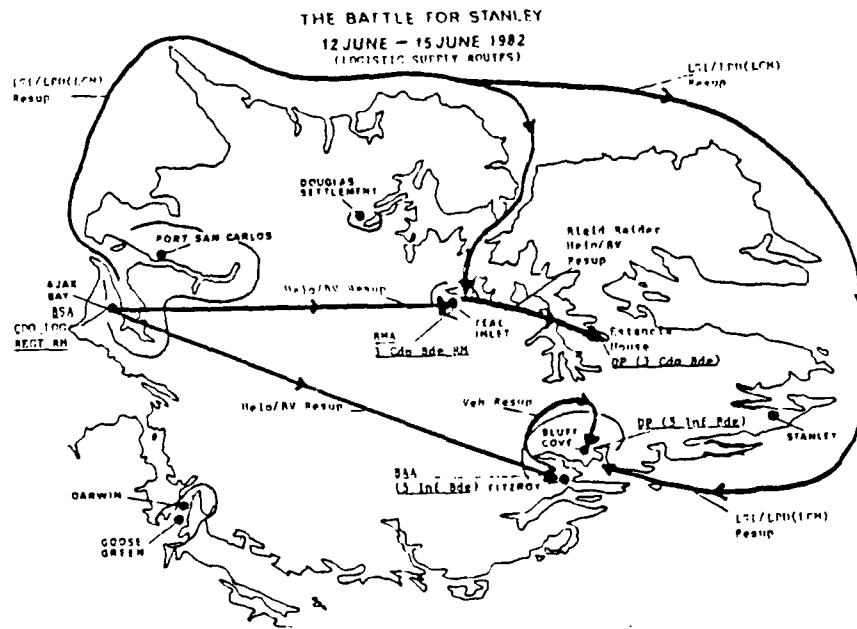
Source: Martin Middlebrook, Operation Corporate: The Falklands War, 1982 (London, England: Penguin Books, Ltd, 1985), p. 197.

APPENDIX E: LOC FROM ASCENSION ISLAND TO THE FALKLANDS



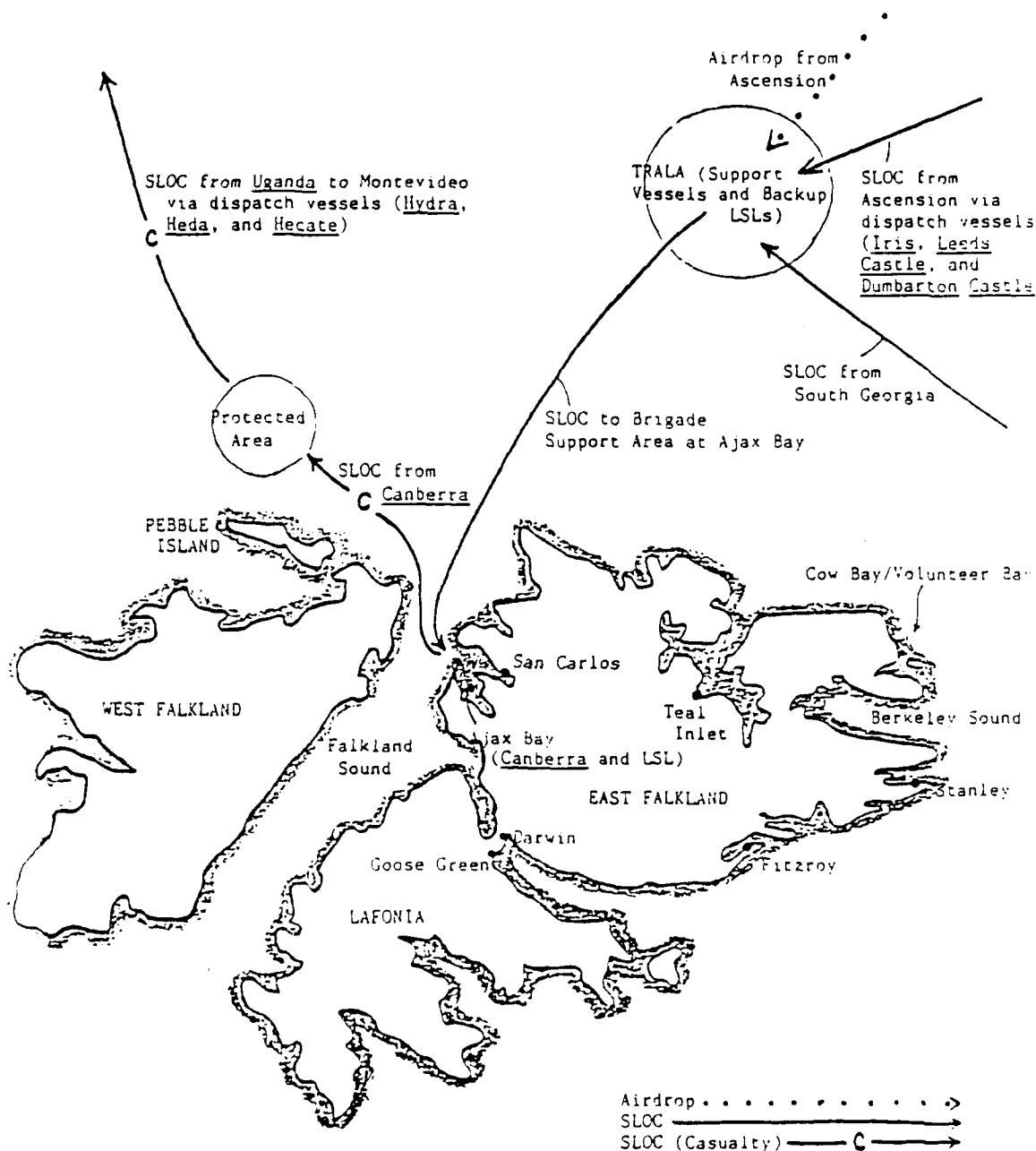
Source: Kenneth L. Privratsky, "British Combat Service Support During the Falkland Islands War: Considerations for Providing Operational Sustainment to Remote Areas." SAMS Monograph, Fort Leavenworth, KS, 1 April 1986, p. 38.

APPENDIX F: FALKLANDS LAND OPERATION SUSTAINMENT CONCEPT



Source: W.J. Tustin, "The Logistics of the Falklands War, Part II," The Army Quarterly and Defence Journal, October 1984, p. 405.

APPENDIX G: FALKLANDS SUSTAINMENT PLAN



Source: Kenneth L. Privratsky, "British Combat Service Support During the Falkland Islands War: Considerations for Providing Operational Sustainment to Remote Areas." SAMS Monograph, Fort Leavenworth, KS, 1 April 1986, p. 39.

APPENDIX H: JTF ALTO PLANNING FORCES

The following forces are available for planning purposes.

1. Army Forces

II Corps HQ

- 1 LID
- 1 Mech Div
- 1 AASLT Div
- 1 Corps Avn Bde
- 3 FA Bde Hq
- 6 Bn (155, SP)
- 6 Bn (8, SP)
- 1 MLRS Bn
- 1 Lance Bn
- 1 ADA Bde
- 1 Cml Bde
- 1 Engr Bde
- 1 MI Bde
- 1 MP Bde
- 1 Sig Bde
- 1 COSCOM
- 1 ASE-F Hq
- 1 ADA Bn (TA)
- 1 Cml Bn (TA)
- 1 Engr Bde (TA)
- 1 MI Bde (OPCON)
- 1 Sig Bde (OPCON)
- 1 ATC Bn
- 1 Cmd Avn Co
- 1 Petrl Gp
- 1 TANMC
- 1 TANCA
- 1 Trans Tml Gp
- 1 TMT Gp
- 1 Ammo Gp
- 1 Medical Gp
- 1 PSYOP/CA Bn
- 1 P&A Bn (TA)
- 1 Special Forces Gp
- 1 Ranger Bn

2. Air Forces (See Air Force Estimate, Encl 1 to CENTAFs Operational Concept)

1 AF Hq

- 1 TAW
- 4 TFW
- 1 TRW
- 1 TCW
- 1 TSG
- 1 SBS
- 1 AWACS

APPENDIX H: JTF ALTO PLANNING FORCES

1 SOS

Reinforcement flow equal to one (1) and one-half tactical fighter wings beginning NET C+44.

3. Naval Forces (See Operational Environment for and Marine Forces), (Enclosure F):

- 1 Fleet Hq
 - 1 CBG
 - 1 SAG
 - 2 URG
 - 2 ARG
 - MPS
 - 1 Maritime Patrol and Recon Force
- Augmentation Force (Available C+75)
 - 1 CBG
 - 1 SAG

4. Marine Forces

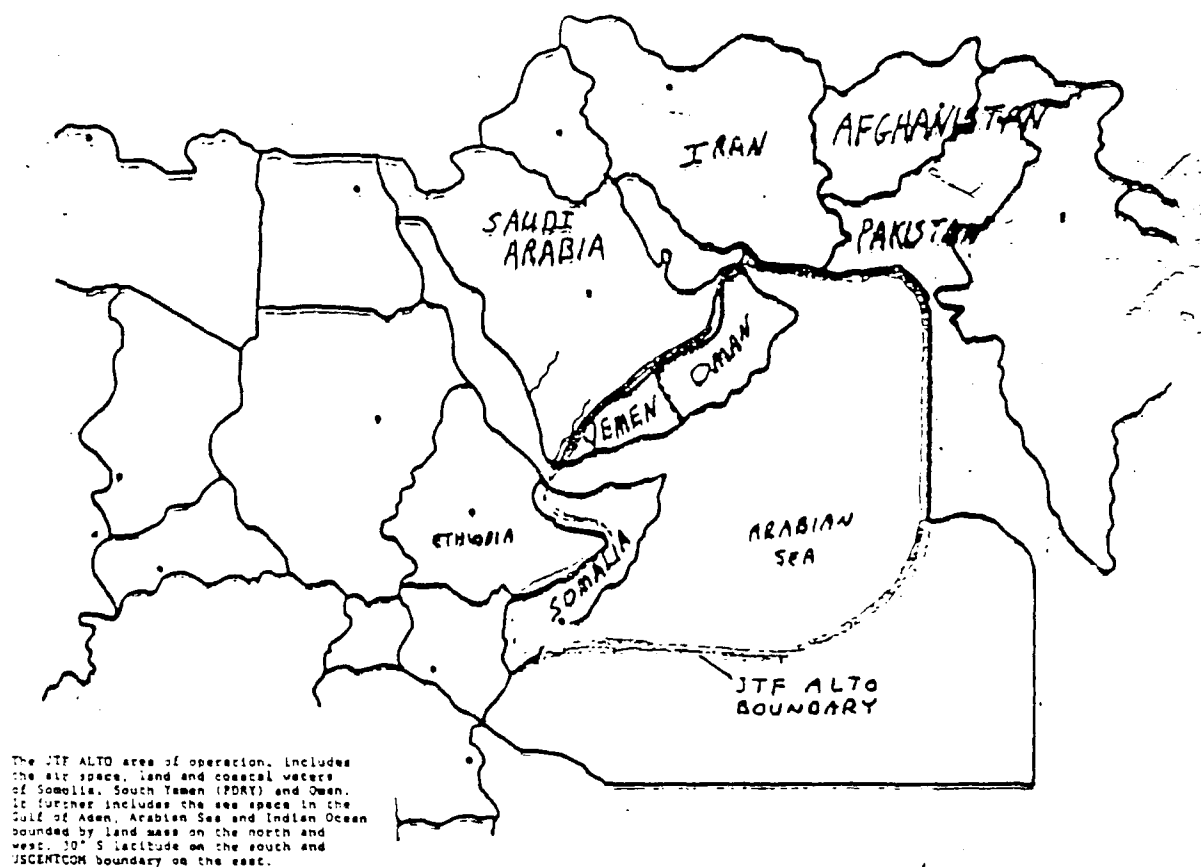
- 1 MEB (MPS-1) (Available C+7)
- 1 MEU (Embarked)
- 1 MEB (MPS-2) (Available C+14)
- 1 MEB (less MEU) (Embarked) (Available C+20)
- 1 MAW (MPS-1&2)
- 1 FSSG

5. Airborne division remains under USCENTCOM control.

6. After reembarkation in Phase III do not employ Marine elements without USCENTCOM approval.

Source: School of Advanced Military Studies' "USCENTCOM Exercise Course Readings, AMS Lesson Number 3-14, AY 88/89" and "USCENTCOM Outline Plan for OPLAN 3001, Exercise supplemental material".

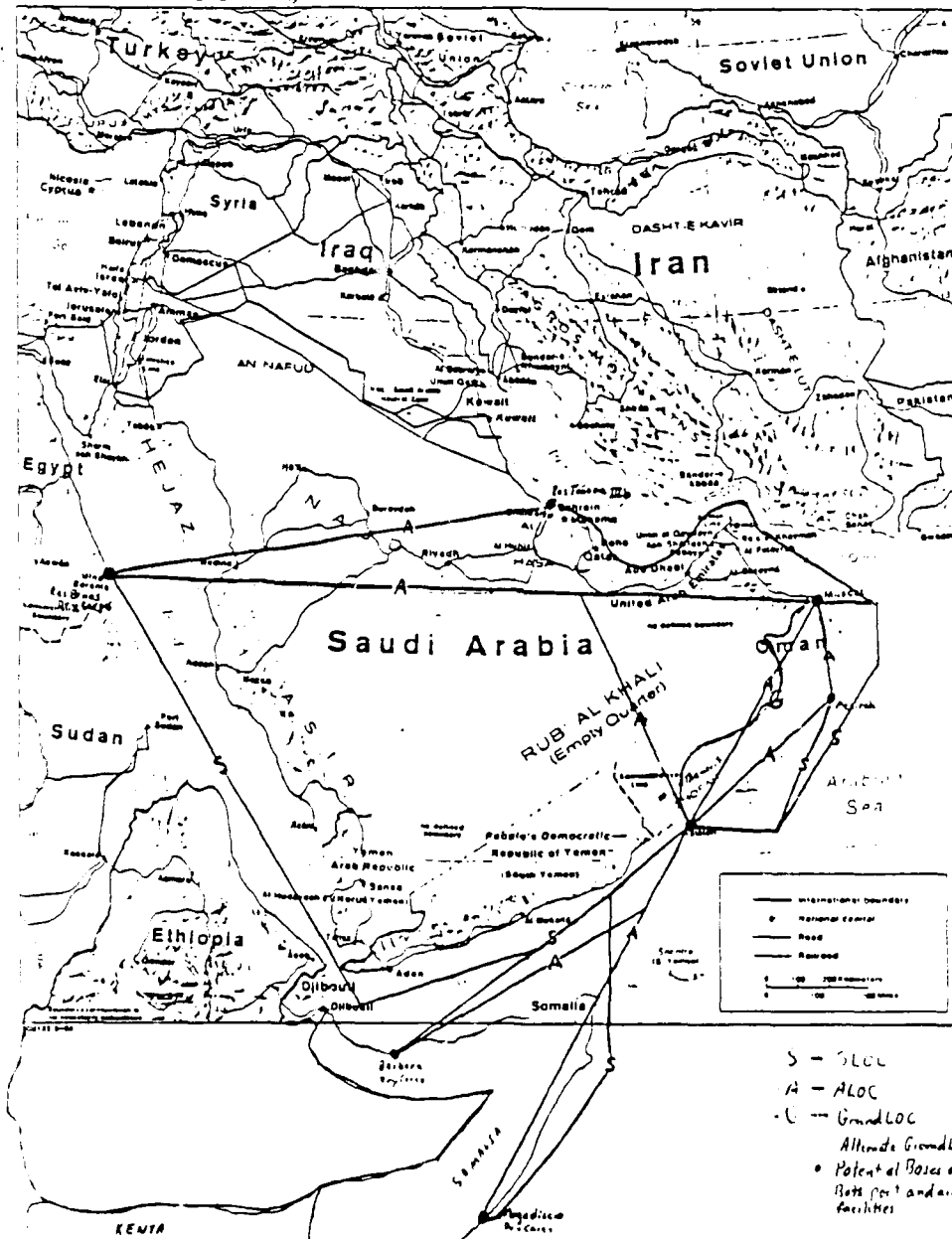
APPENDIX I: JTF ALTO AREA OF OPERATIONS



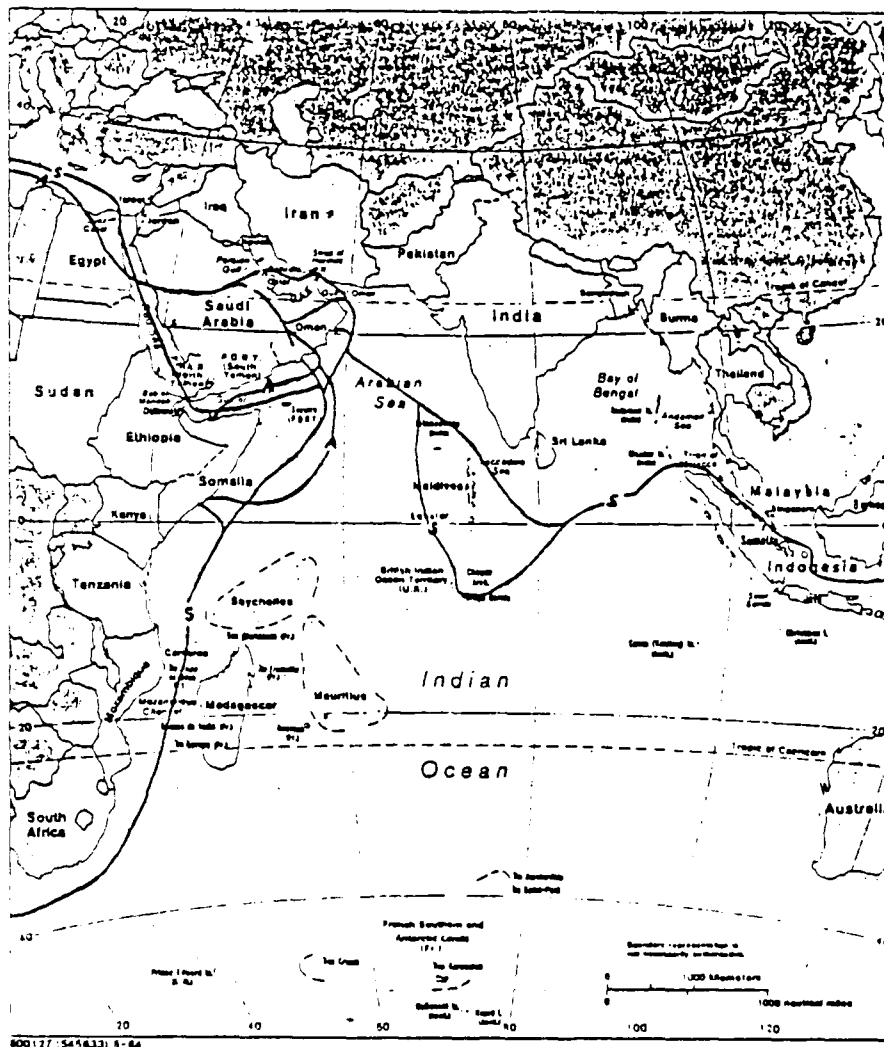
Source: School of Advanced Military Studies' "USCENTCOM Exercise Course Readings, AMS Lesson Number 3-14, AY 88/89" and "USCENTCOM Outline Plan for OPLAN 3001, Exercise supplemental material".

APPENDIX J: JTF ALTO POSSIBLE SUSTAINMENT ORGANIZATION

Arabian Peninsula and Vicinity



APPENDIX K: STRATEGIC LOC TO JTF ALTO



Strategic LOC

- S - LOC
- A - ALOC

ENDNOTES

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34. Harrison, pp. 51-71, and Ruppenthal pp. 176-179, and Crevelde, p. 206.
35. Harrison, p. 450, and Ruppenthal, p. 178.
36. Harrison, pp. 56 and 450, and Ruppenthal p. 178.
37. Harrison, p. 453, and Ruppenthal pp. 180-181.
38. Ruppenthal, pp. 179-180.
39. Harrison, pp. 72-73, and Ruppenthal p. 286. The other contender was the Pas de Calais group, but the Normandy group had better ports, sheltered beaches with better egress capability, and weaker enemy defenses.
40. Harrison, pp. 165-166, 182, and 455.

41. Harrison, pp. 78, and 453-455.
42. Harrison, pp. 71 and 188, and Ruppenthal, p. 269.
43. Ruppenthal, pp. 208-217, and 318-325.
44. Ruppenthal, pp. 297-301.
45. Ruppenthal, pp. 286 and 307.
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48. Ruppenthal, pp. 315 and 467, and Creveld pp. 208-211.
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63. Adams, p. 45.
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65. Privratsky, p. 11, and Tustin, pp. 297 and 400.
66. Adams, p. 47.
67. Privratsky, p. 16, and Tustin, pp. 398-401.
68. Middlebrook, pp. 299-304.
69. The outline USCENTCOM plan and all logistics information is derived from written materials used during the SAMS USCENTCOM Exercise for academic year 1988/1989: "USCENTCOM Exercise Course Readings, AMS Lesson Number 3-14, AY 88/89" and "USCENTCOM Outline Plan for OPLAN 3001, Exercise supplemental material".
70. Martin Van Creveld, p. 236.

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